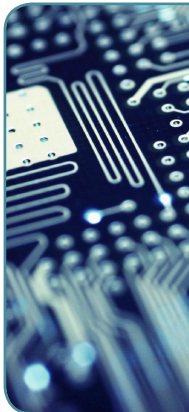


Regionalization drives resurgence in U.S. high-tech manufacturing



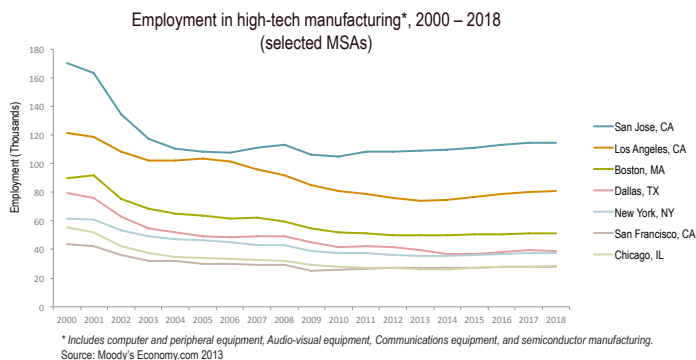
American high-tech manufacturing is on the rebound. After a long period of contraction and job loss, the blow of a recession and fierce competition from low-cost countries, the industry (defined by employment in computer and peripheral equipment manufacturing, audio-visual equipment manufacturing, communications equipment manufacturing, and semiconductor manufacturing) is now enjoying a period of stabilization. Looking forward, manufacturing employment is projected to see positive net growth.¹ While the rate of growth is expected to be a nominal 0.7% between 2013 and 2018, it is a positive sign that the pain endured during the early years of the decade is over. Data and insights from working with clients across different industry segments suggests companies are now seeking a balanced and more regionalized approach to manufacturing, where capital and labor are strategically deployed to leverage the inherent benefits of different countries. Might we be at the beginning of an upswing that sees the U.S. reclaim some of the global share lost to China and Mexico in the world of high-tech manufacturing?

Evolving landscape of U.S. employment

After a rapid and sizable decline in employment between 2000 and 2003, and a slow but steady decline through 2012, the bleed has finally stopped (Figure 1). We are now expecting a reversal in the trend that saw a reduction in U.S. manufacturing operations and a shift offshore, particularly in labor-intensive operations, to net gains in U.S. employment in the sector.

Total high-tech manufacturing employment in the U.S. now stands at just over 1 million, an impressive figure by most standards, and while the Communication and Equipment Sub-Sector remains a drag on overall performance, there is an expectation that the majority of MSAs across the U.S. will see a net increase in high-tech manufacturing-related jobs through 2018 (Figure 2).

Figure 1: Employment in high-tech manufacturing, 2000 – 2018 (selected MSAs)



¹Bureau of Labor Statistics, ²AlixPartners

Figure 2: Employment forecast

	All high-tech	Semiconductor sub-sector	Communications & equipment sub-sector
Manufacturing employment 2012	1.1M	384K	109K
Forecasted growth, 2012 – 2018	0.1%	0.3%	-7.8%
MSAs with projected positive forecasted growth, 2012 – 2018	67%	67%	30%

Taming of the Asian tiger

Part of the reason for the growth in American high-tech prospects directly relates to a shrinking Asian advantage. The lower labor costs that once sent manufacturers scrambling offshore are becoming less of a factor as China, in particular, continues to experience wage inflation and workers demand higher pay. Wages of around 60 cents an hour during the height of the technological migration to Asia have risen to \$3-\$6 per hour in China's eastern manufacturing centers and the prospect of continued wage inflation remains high. Wage increases from 9% to 15% are reported by many manufacturers, a notable figure considering a 7% compounded annual rate represents a doubling in cost every 10 years. Labor costs in the U.S. that were 23x that of China in 2000 are now approximately 8x and continuing to narrow.²

Oil prices are also closing the delta in cost between the U.S. and Asia. Oil prices and bunker fuel prices are steadily increasing and are expected by many analysts to continue upward. The value proposition for off-shore manufacturing when oil was \$70 a barrel can be dramatically different with oil prices at \$140 a barrel. The higher the cost of transportation, the more significant the freight “penalty” becomes to ship over greater distances.

Together, the impact of higher fuel and labor costs are expected to further reduce the cost gap between manufacturing overseas versus domestically. In 2005, Chinese-produced parts arrived at U.S. destination ports an average of 22 percent cheaper than comparable products produced domestically. By the end of 2008, the average price gap had dropped to 5.5 percent³, a dubious advantage to justify the risk and complexity of producing halfway around the world.

Mitigating risks, regionalization & localization

Business continuity planning and risk mitigation continue to increase in importance when selecting locations for production. Such risk considerations, in combination with a narrowing gap in production costs, suggest companies will more critically evaluate the value proposition associated with on, near, and off-shore production. A more dependable and responsive supply chain, more predictable government and regulatory environment, and intellectual property protection are just a few considerations that impact these decisions.

As the devastating 2011 Japanese tsunami demonstrated, customers relying too heavily on finished products and components from Japan, which produces approximately 40% of the world’s flash memory chips and 20% of all semiconductors, learned the pitfalls of “putting too many eggs in one basket.” Sony alone had to close ten factories and two research centers. Less publicized but equally devastating for technology businesses was a serious flood that year in Thailand, which crippled the supply of hard drives and other electronics for months. Increasingly, global producers are hedging their bets by sourcing from multiple nations and regionalizing the supply base. The supply chain disruption and lengthy transit times (a freighter trip across the Pacific Ocean adds weeks to delivery time for components manufactured in China, Japan and Southeast Asia) are causing some companies to rethink what production is supported offshore. We expect U.S. high-tech manufacturing will benefit from supply chain regionalization.

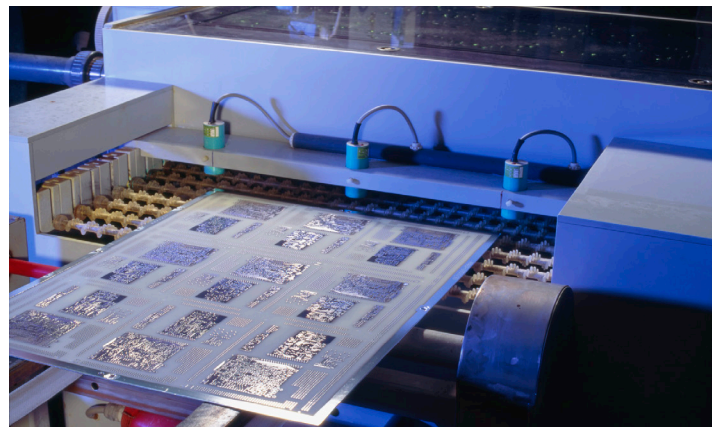
Regionalization and localization trends suggest the U.S. will continue to capture a large share of global direct investment activity. Globally, as production platforms evolve and supply chains respond to shifting revenue opportunity, we expect a rebalancing of the global production platform with enhanced local and regional capability. This suggests that high-tech manufacturers everywhere will increasingly focus on continental

markets, leaving global competition more to producers of high-volume commodity products. Localization and regionalization bodes especially well for companies with facilities in the U.S., home to the world’s largest per-capita high-tech market.

U.S. technology clusters at high end of the value chain

The U.S. may not be the cheapest place for high-tech manufacturing, but it is still regarded by many as the most capable. The American university system sets the world standard, and has a strong record of technology transfer to private sector manufacturers. The U.S., with just 5% of the world’s population, employs a third of its high-tech researchers, and accounts for 40% of high-tech R&D.⁴ When a strong supply of college-trained workers is critical to a company’s success, nobody provides more than the U.S. This American intellectual capital advantage makes it easier to develop prototypes, and test models of products here.

American high-tech companies are quicker to maximize new technologies in their own processes as well, which has helped the U.S. gain a competitive edge, particularly in producing and marketing more sophisticated products. President Obama has stressed his support for the fast-tracking of immigrants with technology skills, as well as the creation of three new “manufacturing innovation institutes” like an existing one in Youngstown, Ohio, in which businesses partner with the Departments of Defense and Energy to create new high-tech American hubs.



In 2011, North American companies generated 33% of high-tech industry earnings from 30% of the revenue, compared to Asian companies’ 37% of earnings from 49% of the revenue. North American companies command three of the industry’s most profitable sectors: internet (76% of global market), software (74%), and semiconductors (48%). Asian companies dominate the six least profitable sectors such as consumer electronics and computer hardware.⁵

Increasingly, American high-tech manufacturing firms continue to locate in clusters close to their suppliers and customers, especially for business-to-business interchanges. In 2010 about

³AlixPartners, ⁴Economist Richard Freeman, ⁵AlixPartners

79 percent of moderately high-tech manufacturing jobs, and 95 percent of very high-tech manufacturing jobs, were located in the 100 largest American metropolitan areas (Figures 3 and 4). Lower-level technology jobs are most concentrated in the southern states, while over a third of the most high-tech positions reside in companies on the West Coast.

As in the past, much of the innovation activity will continue to concentrate in California’s Silicon Valley. Though diminished from the heady dot-com days of the 1990s, Silicon Valley is still the world’s foremost high-tech corridor, home to the headquarters for 26 Fortune 1000 companies such as Apple, Hewlett-Packard, Intel, Google, Yahoo, Cisco and eBay. With one of the greatest concentrations of upper-end technology computer scientists, engineers and skilled workers anywhere, it remains one of the most desirable locations in the world for innovative pursuits. Already the region is home to 10.1% of U.S. high-tech manufacturing jobs, up from 9.1% in 2000 before the dot.com bust. A consortium of Silicon Valley cities and universities has adopted a formal initiative to extend programs and partnerships specifically to grow high-tech manufacturing and jobs.

Austin, already a mushrooming technology hub, should also remain a magnet for high-tech manufacturing growth. Dell, Flextronics, Samsung and AMD all have a well-established presence of manufacturing and R&D operations in the metro area that take advantage of the thousands of graduates in engineering and computer science the University of Texas generates each year. An annual survey by Forbes ranked Austin among the top five U.S. cities for job prospects in 2013.

Other clusters of high-tech opportunity are located in Los Angeles, CA; Binghamton, New York; Portland, Oregon; Boulder, Colorado; Phoenix, Arizona; Boston, Massachusetts and Boise, Idaho. A second tier of smaller but growing high-tech clusters are scattered across the U.S., but expanding most rapidly in the southeastern states where companies are taking advantage of the low cost of living and less expensive, yet skilled, labor force. Other North American cities will also compete with American hubs as important technology manufacturing centers, such as Toronto to the north and Guadalajara, Juarez and Tijuana to the south.

Figure 3: Employment hubs for high-tech manufacturing

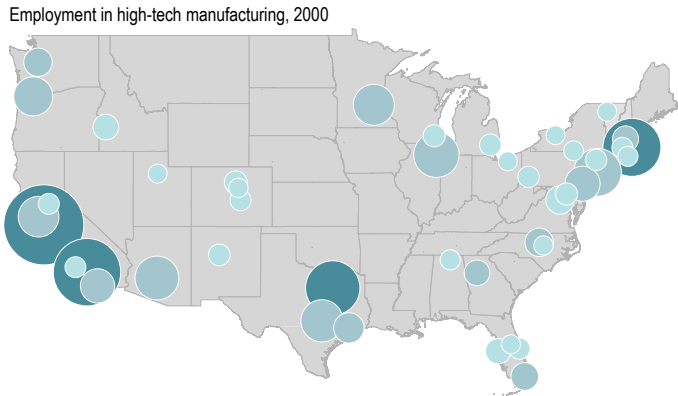


Figure 4: Concentration of high-tech manufacturing

Location	Labor quotient (2012)	Employment (2012)	Employment (2018)	Change
San Jose, CA	14.65	108,520	114,390	+ 5,870
Binghamton, NY	8.06	7,110	7,050	- 60
Palm Bay, FL	7.94	12,680	11,760	- 920
Durham, NC	6.84	15,830	15,460	- 370
Manchester, NH	6.63	10,760	10,120	- 640
Corvallis, OR	5.94	1,880	1,900	+ 20
Boulder, CO	5.75	7,920	8,070	+ 150

What should I consider when locating an operation?

Like most business and real estate decisions, there is no single “right” choice for everyone. At the macro level, companies considering locating—or relocating—manufacturing and/or R&D locations in the U.S. should consider:

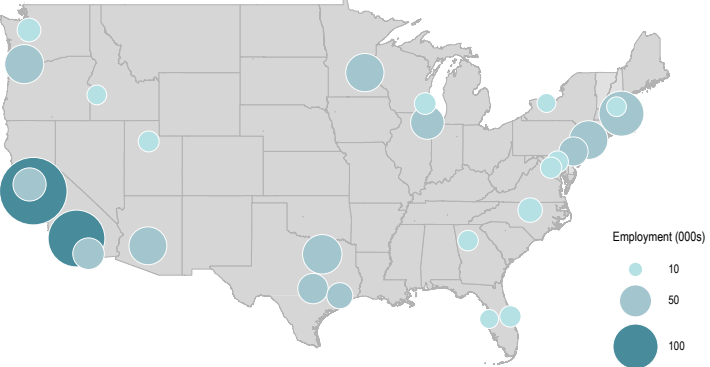
Where are my markets?

If you innovate highly specialized products for specific customers, you’ll likely want to be closest to your largest source of customer orders. If you market consumer electronics or computer-related products to a broader audience, proximity to nationwide distribution may be more important. Location near well-connected “inland ports” such as Dallas/Fort Worth, Chicago, Kansas City, Atlanta, Memphis, Southern California’s Inland Empire or Charlotte might be the best strategy.

How important is proximity to the very best and brightest workers and technological resources?

If access to world-leading scientists, engineers, technicians, educational and technology transfer resources is critical, then Silicon Valley or another top tier high-tech hub might be the best choice of location. Of course, you’ll pay top dollar for both manufacturing/lab space and talent.

Employment in high-tech manufacturing, 2012



Will I require a large manufacturing space with lots of employees?

If so, you will probably want to stay away from top tier high-tech hubs and drive toward lower labor cost markets. From the Southeast to Arizona, there are many manufacturing clusters combining moderately skilled or trainable workers at a reasonable cost (including right-to-work status) with available land at reasonable prices. All locations will offer state and location incentives in support of a new manufacturing operation and in today's competitive climate, areas newer to high-tech manufacturing often offer the best package of incentives that can include tax concessions, economic grants, reimbursements and training partnerships through local institutions. These areas also tend to have more land available than legacy tier one markets. Not only is suitable space in tier one locations like Silicon Valley expensive, the supply is typically scarce as a result of conversion to alternative uses during the production exodus early in the decade. Many former light manufacturing facilities were either converted into offices or now require significant upgrades to accommodate more recent technologies.

At a more tactical level, there are many considerations that need to be contemplated when selecting the best location for operations. These inputs can be placed in categories of cost, business climate and risk, but generally include the following factors:

- **Labor** (sources of talent in the local and regional markets and ability to scale specific employee profiles, employee salary and benefits structure, capacity of the workforce to support the proposed operations)
- **Real estate** (availability and suitability of existing product, geotechnical conditions)
- **Utility infrastructure** (availability and capacity of electricity, water, gas, sewer and sometimes steam)
- **Transportation logistics** (physical transportation infrastructure, accessibility, supply base, customer destinations, cost of inbound and outbound logistics)
- **Risk** (exposure to natural disaster events including seismic, hurricane, tornado, flood and other inclement weather)
- **Taxation** (direct and indirect taxes including income, franchise, gross receipts, sales and use, and property)
- **Ex-pat environment** (quality of life and cost of living, acceptability to redeployed management)
- **Implementation** (construction costs, timing, regulatory and permitting requirements, zoning, impact fees, environmental considerations, impact studies, etc.)
- **Total cost** (one-time and recurring)

Getting it right often means the difference between average performance and a best-in-class operation from a financial and operating perspective. As regionalization drives the resurgence of U.S. high-tech manufacturing and as economic conditions improve globally, we expect to see a combination of outcomes, including:

- 1** Stresses on labor markets and real estate in established locations as demand for skilled labor and quality facilities exceeds supply
- 2** The emergence of new centers that are able to provide the requisite business environment and government support to the industry
- 3** Significant capital investment in locations that can support manufacturing at the high end of the continuum

Finally, in the years to come, regionalization will re-shape the U.S. high-tech manufacturing landscape. Identifying the location that provides a flexible, scalable path for growth is crucial in establishing an effective, sustainable manufacturing solution.

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